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No. 1

A BREATHING SPELL.

Full fifty years of seasons fleet
Give pause to round another bend,
A rallying-place for friends to greet
Ere onward once again we wend.

* * * * *

I.

A gallant flood of noble sweep
Our stream holds bravely on its
course,
With sparkling face and limpid deep
That draw from rills beside the
source.

A varied scene its banks display
In wood and swamp and far ravine;
By mill and farm it makes its way,
By garden-plot and pasture green.

All honour then to those before
Who pointed first the distant goal;
From hill to vale who steadfast bore
To trace the course our waters roll.

With outlook wide, from upland slope,
Our fathers viewed all Nature's
ground;

We strive within a smaller scope
To perfect out our little round.

II.

Children at play upon the shore
Of a mysterious, murmuring sea—
But gathered shells is all our lore,
The vaunt of poor humanity.

'Mid doubt and error on we go,
By glimmering star a path we steer;
To seek the truth but not to know,
The lot of all who voyage here.

We have our moments rich and rare;
Amid long hours of darkest night,
When on our vision bursts the glare
Of meteor's trail or Northern
Light;

Till comes with dawn the lookout's
call,
Strange ships beat up by wind and
lee,
In one great quest adventurers all
We sail no more a lonely sea.

III.

Within the heart's all-cherished shrine
Of talents manifold are three
That Nature's mysteries best divine—
Love, Reverence, and Humility.

In earnest work, in eager play,
By Nature-love united all,
With might and main do what we
may,
Nor boast the great, nor scorn the
small.

"So much to do, so little done"
Each lonely labourer's parting sigh,
Then speed the work so well begun,
The common purpose cannot die.

Each has his place within the plan,
His proper place none else may fill;
In brotherhood our course began,
By brotherhood is furthered still.

* * * * *

Then onward once again we wend
From rallying-place for friends to
greet,

From pause to round another bend
And fifty years of seasons fleet.

FRANK MORRIS

Peterborough, Dec., 1918.

OUR NEW VOLUME.

With the completion of the fiftieth volume of *The Canadian Entomologist*, a convenient opportunity arises for the introduction of any new features or changes that may seem desirable.

For fifty years the size of our page has never varied, a fact which says much for its suitability; but the time has now come when a larger page presents certain advantages, particularly with regard to illustrations. It was accordingly decided at the recent Annual Meeting of our Society to adopt the present size, which is uniform with that of our Annual Report and the Ontario Government bulletins, and is more suitable for full-page illustrations, besides permitting a freer interchange of these with other publications.

This will bring about a considerable reduction in the number of pages, but there will be no material change in the quantity of matter in the text.

The June and July numbers will be issued together and likewise the August and September numbers, so that there will be only ten issues, instead of twelve, two of these being of double size.

POPULAR AND PRACTICAL ENTOMOLOGY.

THE APPLE MAGGOT IN BRITISH COLUMBIA.*

BY W. DOWNES, ENTOMOLOGICAL BRANCH, DOMINION DEPT. AGRICULTURE.

In August, 1917, while collecting insects at Royal Oak, about four miles north of Victoria, B.C., the writer took two specimens of a Trypetid closely resembling the Apple Maggot fly. These were submitted for identification to Dr. J. M. Aldrich, who found them identical with *Rhagoletis pomonella*. Previous to this there have been only two authentic records of its capture on the Pacific slope. In 1894, five specimens were taken by Mr. O. T. Baron in the southern part of California and were described by Snow (1) as *Rhagoletis zephyria*, n. sp. Later this was shown by R. W. Doane (2) and J. M. Aldrich (3) to be a synonym of *R. pomonella*. No further mention of the existence of this species on the Pacific Slope appears to have been made until 1916, when two specimens of the fly were taken on July 26th of that year by Mr. R. C. Treherne (4) at Penticton, B.C.

There is one other record of the fly on the West Coast, but this does not appear to be quite authentic. In 1911, A. L. Melander (5) reported *R. pomonella* as "destructive along the eastern border of the State," but adds that there is no positive evidence of its occurrence in Washington. It is probable in this case that it has been confused with some other insect and, as will be shown later, notwithstanding its occurrence and comparative abundance, the probabilities are against its being a pest of the apple.

The identity of the species being established, a search was at once made for the host plant. This was found without difficulty. Larvæ resembling the species in question were found infesting the snowberry (*Symphoricarpus racemosus* Michx) and 50 pupæ were obtained and kept over the winter. In the spring of 1918, 42 of these were recovered and on August 19th five flies emerged, which were submitted to Dr. Aldrich and were found by him to be identical in all respects with those taken the previous year. It was found that owing to a

*Contributions from the Entomological Branch, Department of Agriculture, Ottawa.
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defective cover on the breeding box, eight flies had emerged previous to this date and had escaped. Altogether 18 flies emerged from the 42 pupæ, up to July 22nd, leaving a balance of 24 to be accounted for. Exactly one month later, hymenopterous parasites commenced to emerge from these remaining pupæ, and during the last week of August 16 appeared. Of the remaining eight pupæ probably some are dead, but possibly a few may carry over until the following summer. Through the courtesy of Dr. L. O. Howard, to whom specimens were sent, this parasite was referred to Mr. A. B. Gahan of the U. S. Bureau of Entomology, who reports that it is a new species of *Opius* (*Vipionidæ*) and will be described by him at a later date.

The adult fly has been taken by the writer in the city of Victoria and all over the Saanich Peninsula wherever its host plant, the Snowberry, grows, the earliest date of capture being July 11th, and the larvæ have been found in the berries at various points on the Mainland, including Agassiz, Lillooet, Lytton, Chase, Armstrong, Vernon, Penticton, Creston and Nelson.

The Snowberry is a very common shrub all over the drier parts of the Coast and interior of British Columbia. The clusters of pure white berries are very conspicuous along the country roads in the early fall, but among them will be seen numbers that are brown, and shrunken. These are berries that have been eaten out by the maggot, the proportion of infested berries on a bush often running as high as fifty per cent. As a rule, only one maggot is found in a berry, but occasionally a fly will deposit an egg in a berry that already contains a maggot, as berries have been found containing two larvæ, in widely different stages of growth. If the berry should be a small one and happen to be touching another as is frequently the case, the maggot will leave the small berry when it has eaten out the pulp and enter the adjoining one and complete its growth there. The *Symphoricarpus* berries that are attacked by the fly do not drop to the ground, and the maggots remain in the fruit until the last vestige of pulp has been eaten. Later they bore through the now shrunken and discoloured skin and pupate among the dead leaves and humus below the bushes. In its selection of bushes on which to oviposit the fly shows a decided preference for those growing on high and dry spots, stunted bushes growing on hillsides generally having the heaviest infestation. The species is evidently very abundant and widely distributed, but it is seldom indeed that the adults are seen, the experience of the writer being identical in this respect with that of Mr. William C. Woods (6) with regard to the variety prevalent in blueberries in Maine. Although collecting was carried on very frequently through the summer, less than half a dozen adult flies were taken by the writer in 1918. The explanation of this probably lies in the fact that the flies are exceedingly active and shy, and the advent of a collector with a sweeping net is sufficient to scare most of them away from his vicinity. The only times the writer has had the opportunity of watching the flies at close range have been when they have alighted on the leaves of the Burdock (*Arctium minus*). They have been seen to alight on the broad leaves of this plant and walk about, applying the labella here and there to the leaf surface. They do not stay long, however, and at the least movement on the part of the observer they make off.

In commenting on this species, Dr. Aldrich, to whom I am indebted for the identification of the flies and notes on its distribution, says: "They are slightly

smaller in size than those bred from apples and haws, but I can see nothing upon which to base even a varietal distinction." Thus it is evidently an example of a "biological race," similar to, and perhaps identical with, the apple maggot of the blueberry. The fact of the insect being so abundant in this province, coupled with its heavy parasitization by a new species, suggests interesting possibilities.

As regards any other food plant, diligent search has so far failed to reveal any other host of the fly in the neighbourhood of Victoria, though likely species such as *Crataegus* and wild crab have been thoroughly examined, both during 1917 and 1918. The comparatively large size and soft, pulpy nature of the *Symphoricarpos* berries are, no doubt, the reason for its selection. Certain species of *Vaccinium* are found in the province, but they are nowhere abundant, and have not been met with by the writer in the territory in which observations on the fly have been carried on.

REFERENCES.

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2. Doane, R. W. Ent. News, IX, p. 69.
3. Aldrich, J. M. Can. Ent., XLI, p. 69.
4. Treherne, R. C. Can. Ent., XLIX, p. 329.
5. Melander, A. L. Wash. Agr. Exp. Sta. Bull. 103, p. 43.
6. Woods, W. C. Me. Agr. Exp. Sta. Bull. 244, p. 254.

ENTOMOLOGICAL SOCIETY OF ONTARIO—ANNUAL MEETING.

The fifty-fifth Annual Meeting of the Entomological Society of Ontario was held at the Ontario Agricultural College, Guelph, on Wednesday and Thursday, December 4th and 5th, 1918. The President of the Society, Professor L. Caesar, O.A.C., occupied the chair. The following were present at the meeting: Mr. J. J. Davis, West Lafayette, Ind.; Prof. P. J. Parrott, Geneva, N.Y.; Prof. R. Matheson, Ithaca, N.Y.; Dr. C. Gordon Hewitt; Messrs. Arthur Gibson, C. E. Petch, C. B. Hutchings, F. W. L. Sladen and Dr. S. Hadwen, Ottawa; Prof. E. M. Walker, Toronto; Mr. James Dunlop, Woodstock; Mr. W. A. Ross, Vineland; Mr. W. E. Biggar, Hamilton; Mr. F. J. A. Morris, Peterborough; Mr. W. A. Clemens, Toronto; Mr. H. F. Hudson, Strathroy; Father Leopold, La Trappe, P.Q.; Prof. W. Lochhead, Macdonald College, P.Q.; Mr. F. Letourneau, Oka, P.Q.; Prof. W. H. Brittain, Truro, N.S.; Mr. John D. Tothill, Fredericton, N.B.; Mr. Norman Criddle, Treesbank, Man.; Professors C. J. S. Bethune, L. Caesar, J. E. Howitt and D. H. Jones; Dr. R. E. Stone; Messrs. A. W. Baker, H. G. Crawford, Eric Hearle, R. M. Aiton, H. C. Hockett and others, Ontario Agricultural College.

By the kindness of Dr. Creelman the visitors were entertained in the College residence during their stay in Guelph. This arrangement added much to their pleasure by affording many opportunities for social converse, and also saved the time usually spent in travelling to and from the town. This hospitality was greatly appreciated by all present and a hearty vote of thanks was accorded at the close of the meeting to President Creelman, and to the Matron and Superintendent of the Dining Hall.

On Wednesday morning a meeting of the Council was held at which the
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report of the proceedings during the past year was drawn up, and various matters relating to the welfare of the Society were discussed. It was decided to enlarge the pages of the "Canadian Entomologist" in order to be uniform with the standard size of bulletins, and to publish ten instead of twelve numbers per annum, omitting the issues of the two mid-summer months, and at the same time the amount of reading matter is not to be reduced.

In the afternoon the members met in the Entomological Lecture-room in the Biological Building, and the proceedings commenced with the presentation of the reports of the Council and the various officers and branches of the Society, followed by the reading of papers, a list of which is given below.

The open meeting was held on Wednesday evening in the auditorium of the Massey Hall, and was opened by a cheery address of welcome from Dr. G. C. Creelman, President of the College. This was followed by a paper in his usual charming style by Mr. Frank Morris on "The Life-history of a Hobby-horse," giving reminiscences of the dawn and growth of his love for Nature and his development as an Entomologist. The special address of the evening was given by Mr. J. J. Davis, of West Lafayette, Indiana, on "President-day Problems in Entomology," which was listened to with great appreciation and interest. At the close of the meeting the members were hospitably entertained by Dr. Creelman with a smoker at his residence.

The meetings were continued during the morning and afternoon of Thursday, during which the officers for the ensuing year were elected, and the following papers read:

"Economic Entomology in Quebec," by Father Leopold; "Insects of the Season in Ontario," by Mr. W. A. Ross and Prof. Caesar; "Aphids—Their Human Interest," by Dr. A. C. Baker, Washington, D.C.; "A Method for the Preservation of Insect Larvæ and Pupæ," by Dr. F. Slater-Jackson, McGill University, Montreal; "Some Insect Problems in the Prairie Provinces," by Mr. Norman Criddle; "The Recovery of the Brown-tail Parasite, *Compsilura*, in new Brunswick," by Mr. J. D. Tothill; Presidential Address, by Prof. Caesar; "Oestrids" (with lantern slides), by Dr. S. Hadwen; "Further notes on the Control of the Cabbage-root Maggot," by Mr. Arthur Gibson; "Some chapters of the early history of Entomology" (with lantern slide portraits), by Prof. Lochhead; "On the Genitalia of Primitive Insects" (with illustrative diagrams), by Prof. E. M. Walker; "The Pear Psylla," by Mr. W. A. Ross; "Notes on certain species of Bees indigenous to both Canada and Great Britain," by Mr. F. W. L. Sladen; "Control of the Apple Maggot," by Prof. Caesar and Mr. W. A. Ross; "The role which Insects play in the food of Trout," by Mr. W. A. Clemens. Most of these papers will be published in full in the next Annual Report of the Society.

It was decided to hold the next meeting at Ottawa in the autumn of 1919.

The election of officers for the ensuing year resulted as follows: President, Prof. L. Caesar, Ontario Agricultural College, Guelph; Vice-President, Arthur Gibson, Ottawa; Secretary-Treasurer, A. W. Baker, O.A.C., Guelph; Curator, Eric Hearle, Guelph; Librarian, Prof. C. J. S. Bethune, O.A.C., Guelph. Directors: J. M. Swaine, Ottawa; C. E. Grant, Orillia; Dr. A. Cosens, Toronto; F. J. A. Morris, Peterborough; J. W. Noble, Essex; J. F. Hudson, Strathroy; W. A. Ross, Vineland Station; Editor of the "Canadian Entomologist," Prof. E. M. Walker, Toronto; Delegate to the Royal Society, the President.

C. J. S. B.

NOTES ON THE DELPHACIDÆ IN THE BRITISH MUSEUM COLLECTION.

BY F. MUIR, HONOLULU, T. H.

When tabulating the genera of Delphacidæ* I was unable to place some genera with any certainty, as I was only acquainted with them through descriptions, which did not mention the characters which I used for primary divisions. Thanks to the kindness of the British Museum authorities I have been able to examine the Delphacidæ in their collection and to make the following notes upon them.

I wish to point out that *Delphacodes* Fieb. (*Delphax* and *Liburnia* of some authors) and allied genera are difficult to deal with, and unless great care be exercised, confusion will arise whenever one goes beyond a comparatively small faunistic area. The species of these genera can only be identified with any certainty by the use of the genitalia; not only should the characters found in the pygofer, anal segment and genital styles be used, but the aedeagus or penis should be dissected out. Many species have a wide geographical distribution and a large range of colour variation, which has led to synonymy. The demarcation between *Delphacodes* Fieb. and its allies is not definitely settled, and will not be until a study of species from various parts of the world shows us the range of variation within the genera. It is, therefore, with reservation that one must synonymize at the present time.

Canyra Stål.

The four species standing under this name, *C. strigulosa* Walk., *C. revertens* Walk., *C. retrahens* Walk. and *C. vittifrons* Walk. are the same as *Ugyops*, but they have a longitudinal depression along the first joint of the antennæ. I have not seen the type species of the genus.

Epibidius Fowler.

This genus is congeneric with the four species under *Canyra* and has the first antennal joint sulcate.

Ugyops Guein.

Delphax longicornis Walker and *Delphax media* Walker, both belong to this genus.

Consualia Distant.

I cannot separate this from *Ugyops*.

Onkelos Distant. = *Punana* Muir.**Ilburnia** White. = *Nesosydne* Kirkaldy.

Delphax simulans Walk. belongs to this genus.

Ilburnia nephelias (Kirk.) = *I. disjuncta* (Muir).

Ambarvalia Distant.

The tibial spur is cultrate, half the length of the first tarsus, convex on both sides, with three teeth on the hind margin. The spur places this insect in the *Alohini*, otherwise the insect has a superficial resemblance to the *Tropidocephalini*.

Upachara Distant.

The genus has the spur small, thick, with a tooth at the apex, but none on

*Canadian Entomologist 1915, page 296 e. o.
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the hind margin. I consider it should be placed in the Tropidocephalini. The carinae of the head and thorax are obscure.

Pundaluoya Kirkaldy.

The type of this genus, *Delphax ernesti* Kirby, has the tibial spur cultrate, thick, concave on the inner surface, without teeth on the hind margin. I place it in the Tropidocephalini. The carination of the head is similar to that of *Belocera* Muir but, apart from the spur, the terete antennae distinguishes it from that genus as well as from *Perkinsiella* Kirk. There is no carination on the lateral margin of the pronotum.

The genus *Peregrinus* Kirk. is quite distinct in general facies, shape and carination of head and thorax. The six species under the genus I place as follows:

1. *Pundaluoya ernesti* (Kirby). Type.
2. *Pundaluoya simplex* Dist. Typical. This only differs in the lighter colour from *P. ernesti* and is represented by a female. Only the capture of the male will decide if this be only a colour variety or not.
3. *Pundaluoya simplex* Dist. = *Peregrinus maidis* (Ashmead).
4. *Pundaluoya insignis* Dist. = *Perkinsiella insignis* (Dist.).
5. *Pundaluoya facilis* Dist. = *Perkinsiella facilis* (Dist.).
6. *Pundaluoya pulchella* Dist. = *Phyllodinus pulchella* (Dist.).

The front legs of this species are flattened, otherwise it would be a *Dicranotropis*.

Zuleika Distant.

First tarsus slightly longer than the other two together, spur as long as the first tarsus, broad, laminate, with small teeth on the hind margin. Lateral carinae of pronotum slightly diverging curved. I cannot separate this genus from *Chlariona*.

Opiconsiva Distant. = *Delphacodes* Fieb.

1. *O. fuscovaria* Dist. = *Delphacodes puscovaria* (Dist.).
2. *O. insularis* Dist. = *Megamelus furcifera* (Horv.).
3. *O. derelicta* Dist. = *Megamelus furcifera* (Horv.).

This is a light female specimen of *O. insularis*.

4. *O. modesta* Dist. = *Delphacodes modesta* (Dist.).
5. *O. balteata* Dist. = *Megamelus furcifera* (Horv.).

The second specimen under this name is a different species.

6. *O. colorata* Dist.

The genitalia of this species are similar to *M. furcifera* (Horv.), but the head and thorax are black, except in the two brachypterous specimens, in which there is a light mark down the middle of the thorax.

7. *O. gloriosus* Dist.

One specimen without abdomen, similar to *M. furcifera* (Horv.).

Nilaparvata Distant. = *Delphacodes* Fieb.

The type of this genus is a damaged male, but it is in good enough condition to enable me to be sure of the synonymy of the species.

1. *Nilaparvata greeni* Dist. = *Delphacodes sordescens* (Motsch.) = *Delphacodes anderida* (Kirk.).

I was in doubt as to whether *D. sordescens* was the same as *D. anderida* until I had examined the Indian specimens.

2. *Nilaparvata mahensis* Dist. = *Delphacodes mahensis* (Dist.).

Toya Distant. = *Delphacodes* Fieb.

This genus is described as having a transverse ridge between the eyes, but it has the same carination of the vertex as *Delphacodes* (*Liburnia* of some authors); the medio-basal carina dividing the two basal areas is obscure. The pronotal lateral carinae slightly divergently curved, not reaching the hind margin. Vertex as wide as long. Second joint of antennae slightly more than twice the length of the first. First hind tarsal joint slightly longer than the other two together, spur broad, laminate, as long as the first tarsus, small teeth on the hind margin.

Toya attenuata Dist. = *Delphacodes attenuata* (Dist.).

Kalpa Distant = *Delphacodes* Fieb.

1. *Kalpa aculeata* Dist. = *Delphacodes sordescens* (Motsch.).

This is represented by one female, the type, which, on account of the difference in coloration appears to have more pronounced carinae on the head than has the male. This species and *D. bakeri* Muir, are peculiar in having small spines on the basal joint of the hind tarsus.

Akilas Distant.

I cannot separate this genus from *Gelastocephalus* Kirk.

Hapalornelus Stol.

The spur of this genus is narrow, pointed and thickened, with the inner surface distinctly concave, with many small teeth on the hind margin. The pro- and metanota each have three carina. The long, narrow wings constricted in the middle where the cross-veins are, distinguish it from other genera.

Sogata Distant.

The type of the genus, *S. doherlyi* Dist., is represented by one female. The first hind tarsal joint is longer than the other two together; tibial spur laminate, many fine teeth on hind margin, not so long as the first tarsal joint. Second joint of antennae more than twice the length of the first. Vertex, longer than wide, base wider than apex; length of face three times the width. This comes very close to *Kelesia*.

1. *Sogata doherlyi* Dist.

2. *Sogata sternalis* Dist. Very near to *Kelesia kirkaldyi*, but it is necessary to dissect out the aedeagus.

3. *Sogata pusana* Dist. Very near to *Kelesia fieberi* Muir, but it is necessary to dissect out the aedeagus.

4. *Sogata distincta* Dist. = *Megamelus furcifera* (Horv.). The type and two other specimens are as above, while four other specimens under this name are *Sogata pusana* Dist.

5. *Sogata pallescens* Dist. Five specimens including the type are *Megamelus furcifer* (Horv.), while eight other specimens under this name are *Delphacodes sordescens* (Motsch.).

6. *Sogata thoracica* Dist. = *Delphacodes thoracica* (Dist.).

Delphax unicolor Walk., from Hudson Bay is a nymph and not of a delphacid.

Matutinus Distant.

This genus was placed among the Cixiini, but it is a Delphacid, which I consider to be indistinguishable from *Chlorionidea* Fieb.

ODONATA OF THE FRANCONIA REGION, NEW HAMPSHIRE.

BY R. HEBER HOWE, JR., CONCORD, MASS.

Mrs. Annie T. Slosson's captures of Odonata in Franconia, made now over a decade ago, have already attracted odonatologists to a recognition of this interesting region. Franconia is thus the type locality of *Gomphus borealis* Needham, and *Somatochlora minor* (Calv.), and five of Dr. Scudder's species were first described from the White Mountain region. It has been difficult, however, to limit the scope of this paper to just the township, and impractical to take a definite radius, for lying so near the Connecticut Valley, a very varied topographic region would be included, when it seems more interesting and proper to make the paper one on the mountain and foot-hill stations. I am, therefore, including the records made for the immediate region of the higher White Mountains, a region I think often referred to by Hagen and others on odonate labels as "White Mts." The list thus includes the notable records and type stations of Dr. S. H. Scudder on Mt. Washington, and at The Glen, and records of Dr. P. P. Calvert at Fabyan's, Dr. G. M. Allen at Intervale in 1899, etc.

My own collecting in this region includes one day's trip made in 1916, from southern New Hampshire, north through the Profile Notch and south again by the Crawford (Psyche 24:45-53, 1917), and during the past summer when I was a resident of Franconia from June 24 to August 5, and during a two days' trip on June 1 and 2. One of the interesting features of my list is, not so much that I failed to find many species recorded by Mrs. Slosson over her long years of collecting in the region, but that in one summer I should have taken a considerable number of common species which it seems she certainly would have found; facts indicating very probably changes or local extensions of insect ranges in this region.

Zygoptera.

AGRIONIDÆ.

1. *Agrion amatum* Hagen.

June to July. Mrs. Slosson writes me, "There are not many bodies of water around Franconia where he was not to be found twelve years ago,—Pond Brook, Streeter Pond, Black Brook, along the Gale River, everywhere." Dr. Allen found it common at Intervale by the river, last seen on July 29. This species I was unable to find at all in the entire region.

2. *Agrion æquabile* Say.

June to July. Dr. Allen found it along the Saco River from June 27 to July 3.

3. *Agrion maculatum* Beauv.

June 20 to 27.

I found it common about the brooks leading out of Echo and Profile Lakes, uncommon on Black Brook, and at Pearl Lake, Lisbon. It was taken at Intervale by Dr. Allen from June 20 to July 12. There is a male in U. S. N. Museum taken at Franconia by Mrs. Slosson.

CÆNAGRIONIDÆ.

4. *Lestes congener* Hagen.
August and September. Dr. Allen took three specimens in the Saco meadows at Intervale,—July 3 to 26. There is a specimen in the U. S. N. Museum taken at Franconia by Mrs. Slosson.
5. *Lestes disjunctus* Selys.
June to August. Mrs. Slosson collected this species at Franconia, June 26, and Dr. Calvert at Fabyan's. Between July 16 and 29 I found it common at Mill Pond, Lyman, and at Pearl Lake, Lisbon. It was taken commonly at Intervale and North Conway by Dr. Allen, from June 21 to Sept. 13, and by a collector named Skinner at Jackson.
6. *Lestes eurinus* Say.
June. Dr. Allen took three specimens at a small pond near Saco River, North Conway, on June 29, the northernmost station in New England for the species.
7. *Lestes forcipatus* Rambur.
June to August. Dr. Allen took several specimens in the Saco meadows, Intervale, from June 21 to August 8.
8. *Lestes inequalis* Walsh.
June and July. Mrs. Slosson collected this species in June at Franconia, and Dr. Allen at Intervale from July 3 to 26 in the Saco meadows.
9. *Lestes rectangularis* Say.
June 22 to Sept. 18. Mrs. Slosson collected it at Franconia, and Dr. Allen at Intervale, and North Conway in the Saco meadows and at Pudding Pond.
10. *Lestes uncatulus* Kirby.
June. Mrs. Slosson secured it at Franconia, and Dr. Allen two females, (determination doubtful) on June 27 in the Saco meadows.
11. *Lestes unguiculatus* Hagen.
June 12. There is a specimen in the Museum of Comparative Zoölogy at Cambridge labeled "White Mts.," and I took one specimen at Streeter Pond (upper) which flew from my hand after capture, and which I am reasonably sure was of this species. Mrs. Slosson writes me she has taken it at Franconia.
12. *Lestes vigilax* Hagen.
July and August. Dr. Allen secured it at Pudding Pond, North Conway, from July 1 to August 21.
13. *Argia moesta* Hagen.
Dr. Allen collected it at Pudding Pond, North Conway.
14. *Argia violacea* Hagen.
June and July. I took specimens from July 17 to 31 at Partridge Lake, Littleton, and at Forest Lake, Whitefield. Dr. Allen found it common at Intervale from June 20 to August 9.
15. *Enallagma calverti* Morse.
June to August. I found it common at Profile and Echo Lakes, Franconia, from June 27 to August 12, and took one specimen at Lonesome Lake, Lincoln, July 4.

16. *Enallagma cyathigerum* Charp.

July. Mrs. Slosson collected it at Franconia, and Selys records it from Hermit Lake, Mt. Washington. I took it on July 4 commonly about Lonesome Lake, Lincoln.

17. *Enallagma aspersum* Hagen.

July to August. Dr. Allen took several specimens in the Saco meadows, at Pudding Pond and Echo Lakes, North Conway, from June 19 to August 21. He remarks, "Larger than usual, but apparently of this species." There is a specimen in the U. S. N. Museum from Echo Lake, North Conway, taken in 1890.

18. *Enallagma ebrium* Hagen.

July and August. I took it commonly at Streeter Pond, Franconia, and at Mill Pond, Lyman, from July 3 to 26. Dr. Calvert secured it at Fabyan's in August.

19. *Enallagma hageni* Walsh.

June to August. There is a male in the U. S. N. Museum from Franconia collected by Mrs. Slosson, and Dr. Allen took it commonly in the Saco meadows from June 20 to August 6. I found it common at Streeter Pond, Franconia; Partridge Lake, Littleton; Pearl Lake, Lisbon; Forest Lake, Whitefield, from July 3 to July 31.

20. *Nehalennia irene* (Hagen).

July. There is a male in the U. S. N. Museum collected by Mrs. Slosson at Franconia and Mt. Washington. Dr. Allen took it at North Conway on July 1, and I found them common at Streeter Pond, Franconia; Mill Pond, Lyman; Partridge Lake, Littleton, and at Bowles' Pond on Lafayette Brook, from July 3 to 29.

21. *Amphiagrion saucium* Burm.

June to July. Mrs. Slosson collected it at Franconia,—Dr. Allen on the Saco meadows, Intervale, from June 19 to July 10, and I secured several specimens at Mill Pond, Lyman, on July 16 to 17.

22. *Chromagrion conditum* Hagen.

June to July. Mrs. Slosson collected it at Franconia, Dr. Allen in the Saco meadows, Intervale, from June 22 to July 6,—there is a male in the U. S. N. Museum collected by Mrs. Slosson at Franconia, and I took a male at Profile Lake on July 20.

23. *Ischnura posita* Hagen.

There is a specimen in the Museum of Comparative Zoology labeled "White Mts."

24. *Ischnura verticalis* Say.

June to September. There is a male in the U. S. N. Museum collected at Franconia by Mrs. Slosson,—Dr. Allen took it commonly at Intervale from June 19 to September 13,—Dr. Calvert collected it at Fabyan's,—Skinner took it at Jackson,—there is a specimen from North Conway in the Museum of Comparative Zoology,—and I found it common at Streeter Pond, Franconia; Mill Brook, Lyman; Forest Lake, Whitefield; Partridge Lake, Littleton; Pearl Lake, Lisbon, and at Bowles' Pond, Lafayette Brook, Franconia, from July 3 to 31.

This is one of the most abundant and evenly distributed species in New England.

Anisoptera.

AESCHNIDÆ.

25. *Cordulegaster diastatops* Selys.
June to August. Mrs. Slosson took it at Franconia, and there is a specimen in the U. S. N. Museum collected by her. Dr. Allen took it in the Saco meadows, Intervale, from June 22 to July 1, and it was reported from the "White Mts." by Selys.
 26. *Cordulegaster maculatus* Selys.
June to July. Dr. Allen took it at Diana's Baths, North Conway, and in the Saco meadows, Intervale, from June 19 to 22,—and I found it common at the outlets of Echo and Profile Lakes from July 20 to 27.
 27. *Ophiogomphus colubrinus* Selys.
Recorded from the "White Mts." by Mr. Banks.
 28. *Ophiogomphus aspersus* Morse.
June and July. Dr. Allen took two males and a female on Mt. Bartlett on June 24 and July 20, and a female at Intervale on July 4.
 29. *Ophiogomphus mainensis* Packard.
Recorded from the "White Mts." by Selys, and from Franconia by Mrs. Slosson.
 30. *Gomphus albistylus* Hagen.
July 20 to August 1. I found it common at the outlet from Echo Lake between the above dates.
 31. *Gomphus borealis* Needh.
One of the type specimens was collected by Mrs. Slosson at Franconia. Dr. Allen took a female of *G. descriptus* (?) in the Saco meadows, June 21, which may belong here.
 32. *Gomphus exilis* Selys.
June and July. I found tenerals at Echo Lake on July 20; an adult at Profile Lake July 27, and an adult at Pearl Lake, Lisbon, on July 25. Dr. Allen found it common at North Conway and Intervale from June 19 to 29.
 33. *Gomphus parvulus* Selys.
June. Hagen recorded it from the "White Mts." in June. Mrs. Slosson from Franconia, and on June 28 I took a female near Lafayette Brook, Franconia, where I saw two others.
 34. *Gomphus spicatus* Hagen.
June. Mrs. Slosson found it at Franconia on June 17. Dr. Allen took it in the Saco meadows, Intervale, from June 20 to 24.
 35. *Gomphus brevis* Hagen.
June. Dr. Allen took both sexes on the Saco meadows, Intervale, from June 20 to 24.
- NOTE.—*Gomphus notatus* Ramb., was probably taken at Campton, but the mis-spelling of the locality recorded makes the record doubtful.
36. *Baïaschna janata* Say.
June and July. Recorded from the "White Mts." by Hagen. I

found it at Echo Lake from June 30 to July 20. Dr. Allen took one at Intervale on July 4 in the Saco meadows.

37. *Anax junius* Drury.

July. I saw one at Streeter Pond, Franconia, on July 3. Mrs. Slosson reports one on the Gale River on June 20.

38. *Aeshna canadensis* E. Walker.

July and August. Recorded from the "White Mts." by Shurtleff. Dr. Calvert took it at the White Mt. House, at Franconia, and at Fabyan's. I found it common at Mill Pond, Lyman, on July 29.

39. *Aeshna constricta* Say.

August and September. It was taken at Hermit Lake, and Fabyan's by Dr. Calvert, and by Dr. Allen at Carter's Notch, and Intervale from August 21 to September 18. It is probably that some of the latter material should have been referred to *A. umbrosa*, a closely related species since described.

40. *Aeshna eremita* Scudder.

August. The type was taken at Hermit Lake, Mt. Washington, by Dr. Scudder, and it was also taken there by Mrs. Slosson, and a specimen of her collecting is in the U. S. N. Museum. I took it at Profile Lake August 12, 1916, and it was common at Lonesome Lake, Lincoln, on August 1. Undoubtedly undetermined material collected in July to September at Carter's Notch by Dr. Allen belongs here.

41. *Aeshna juncea* Linn.

August. It was recorded from the "White Mts." by both Scudder and Hagen. Mrs. Slosson also took it at Franconia.

42. *Aeshna caerulea septentrionalis* Burm.

It was recorded from the "White Mts." by both Scudder and Hagen.

43. *Aeshna umbrosa* E. Walker.

August. Mrs. Slosson took it at Franconia, and a specimen collected by her is in the U. S. N. Museum. It was recorded from the "White Mts." by Sprague, and from Hermit Lake by Scudder. I took a specimen at Lonesome Lake, Lincoln on August 1, and one in Franconia on the same day.

44. *Aeshna verticalis* Hagen.

July to September. Dr. Allen took it at Hermit Lake, Mt. Washington; at Carter's Notch; at Intervale and North Conway from July 22 to Sept. 11. In view, however, of the southern range of this species it would seem probable that his specimens were misdetermined. *A. canadensis*, a very closely related species, undescribed in 1899, was probably the insect captured.

LIBELLULIDÆ.

45. *Macromia illinoiensis* Walsh.

June. Dr. Allen took a male at Intervale on June 18.

46. *Dorocordulia libera* Selys.

Mrs. Slosson took it in Franconia.

47. *Helocordulia uhleri* Selys.

June. I took a male on June 25 at Echo Lake, Franconia.

48. *Somatochlora albicincta* Burm.
July and August. Drs. Calvert and Scudder found it at Hermit Lake, Mt. Washington. Dr. Allen at Carter's Notch on July 24. I found it at Lonsome Lake, Lincoln, from July 4 to August 1, and at Profile Lake, Franconia, from July 20 to 27.
49. *Somatochlora cingulata* Selys.
July. Hagen reported it from the "White Mts.," and Dr. Allen took four specimens at Carter's Notch on July 22.
50. *Somatochlora forcipata* Scudd.
July. Mrs. Slosson took it at Franconia and on Mt. Washington. Dr. Scudder's type was taken at "The Glen, White Mts.," and I took it at Profile Lake on July 20.
51. *Somatochlora elongata* Scudd.
July and August. Dr. Scudder's type was taken in the "White Mts." at Hermit Lake, Mt. Washington, and Mrs. Slosson took it at Franconia, and a specimen collected by her is in the U. S. N. Museum. Dr. Allen took it in the Saco meadows, Intervale, from Aug. 16 to 21 and I took two specimens at Profile Lake, July 27.
52. *Somatochlora minor* Calvert.
June. One of Dr. Calvert's types came from Franconia, where it was also taken by Mrs. Slosson on the Butter Hill Road.
53. *Somatochlora tenebrosa* Say.
August. Dr. Allen took one at Intervale on August 15.
54. *Somatochlora walshii* Scudd.
August. Dr. Scudder's type was taken at The Glen, "White Mts."
55. *Cordulia shurtleffi* Scudder.
June to August. Dr. Scudder's type was taken at Hermit Lake, Mt. Washington. Mrs. Slosson took it at Crawford Notch and Franconia, and I took it at Echo Lake, June 27.
56. *Tetragoneuria canis* MacLach.
Mrs. Slosson took one example of this species at Franconia.
57. *Libellula exusta* Say.
June and July. Mrs. Slosson took it at Franconia, and I found it at Streeter pond, Franconia, from July 3-12. Dr. Allen took it at Intervale from June 19 to July 28.
58. *Libellula pulchella* Drury.
July. Mrs. Slosson took it at Franconia, and Dr. Allen at Intervale from July 20 to Aug. 31. I found it common at Pearl Lake, Lisbon, on July 25, and at Mill Pond, Lyman, on July 29.
59. *Libellula quadrimaculata* Linn.
June and July. Mrs. Slosson found it at Franconia, and I found it common at Mill Pond, Lyman, July 16, and saw one specimen at Pearl Lake, Lisbon, on July 25.
60. *Plathemis lydia* Drury.
June and July. Mrs. Slosson found it at Franconia, and Dr. Allen at Intervale from June 22 to July 24.
61. *Nannothemis bella* Uhler.
July. Dr. Allen took it at Pudding Pond, North Conway, from July 1 to 28, and I found it common at Mill Pond, Lyman, July 16 to 29.

62. *Sympetrum costiferum* Hagen.

July and August. Mrs. Slosson took it at Franconia, and a specimen of her collecting is in the U. S. N. Museum. Dr. Allen took it from July 28 to Aug. 21 at North Conway and Intervale. I found it common at Streeter Pond, Franconia, and at Forest Lake, Whitefield, from July 12 to 31.

63. *Sympetrum rubicundulum* Say.

July and September. Mrs. Slosson took it at Franconia and Mt. Washington; Dr. Calvert at Fabyan's; Hagen records it from Hermit Lake, "White Mts.," and Dr. Allen took it from July 4 to Sept. 1, at North Conway and Intervale. I found it at Pearl Lake, Lisbon, and at Mill Pond, Lyman, from July 25 to 29.

64. *Sympetrum obtrusum* Hagen.

July and August. Dr. Calvert took it at Fabyan's, and Dr. Allen at North Conway and Intervale from July 4 to Sept. 1. I took a single male at Pearl Lake, Lisbon, on July 25. Mrs. Slosson took it at Franconia.

65. *Sympetrum scoticum* Donovan.

Mrs. Slosson took one example at Franconia. It has never been taken again in New England.

66. *Sympetrum semicinctum* Say.

July and August. Hagen recorded it from the "White Mts.," Mrs. Slosson from Franconia; Dr. Calvert from Fabyan's; and Dr. Allen took one at Intervale on Aug. 16. I found it at Streeter Pond, July 12, and at Mill Pond, Lyman, on July 17.

67. *Sympetrum vicinum* Hagen.

Mrs. Slosson took it at Franconia; Dr. Calvert at Fabyan's; and Dr. Allen at Intervale from Aug. 10 to Sept. 13.

68. *Leucorrhinia frigida* Hagen.

July. Mrs. Slosson took it at Franconia and Mt. Washington, and Dr. Allen on July 1, at Pudding Pond, North Conway.

69. *Leucorrhinia glacialis* Hagen.

June and July. Mrs. Slosson took it at Franconia, and on Mt. Washington. Hagen recorded it from the "White Mts." Dr. Allen at North Conway from June 21 to July 1. I found it common at Lonesome Lake, Lincoln, on July 4, and rare on Aug. 1.

70. *Leucorrhinia intacta* Hagen.

June and July. Mrs. Slosson took it at Franconia, and on Mt. Washington. Dr. Allen found it common at Intervale from June 20 to July 4. I found it at Streeter Pond, Franconia on July 3, and at Mill Pond, Lyman, on July 17.

71. *Leucorrhinia hudsonica* Selys.

Mrs. Slosson took it at Franconia, and on Mt. Washington.

72. *Leucorrhinia proxima* Calvert.

Mrs. Slosson took it at Franconia, and on Mt. Washington, and there is a specimen in the U. S. N. Museum collected by her. Hagen recorded it from the "White Mts."

THE IDENTITY OF THE WHEAT MIDGE IN ONTARIO.

BY W. A. ROSS, DOMINION ENTOMOLOGICAL LABORATORY, VINELAND STA., ONT.

In connection with the re-appearance in Ontario of the wheat midge or "red weevil" in fairly large numbers in 1917 and in lesser numbers this year, it is worth while recording that our species is *Thecodiplosis mosellana* Gehin, and not as we thought, *Cecidomyia*, or *Diplosis*, *tritici* Kirby. This summer I reared a considerable number of adult midges from larvæ collected in 1917 in

Welland and Lincoln Counties and submitted them to Dr. E. P. Felt, who, after making a careful examination, sent me the following report: "I have decided that the species is with very little question *Thecodiplosis mosellana* Gehin. I

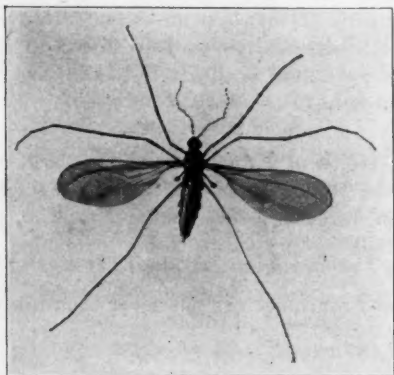


Fig. 1.—Wheat Midge (*Thecodiplosis mosellana* Gehin.), much enlarged.



Fig. 2.—Maggots of Wheat Midge, much enlarged. The larva on the right is within its larval case.

find on looking up our records that we reared the same insect in 1912 from wheat heads collected at Batavia, N.Y., and the probabilities are, so far as this country is concerned, that this is the destructive wheat midge. . . . I am well satisfied that this is not the *Cecidomyia*, or *Diplosis*, *tritici* Kirby unless the characterizations and illustrations of this insect are erroneous, something we are hardly warranted in assuming."

CATOCALA ULALUME STRECK. VS. CATOCALA CAROLINA HOLLAND.

BY G. H. FRENCH, CARBONDALE, ILL.

In September, 1877, Herman Strecker described *Catocala ulalume* in his serial, "Lepidoptera Rhopaloceres et Heteroceres," page 132. In the April number of the Bulletin of the Brooklyn Entomological Society for 1880, page 97, Mr. Strecker describes *Catocala dejecta*. I have taken both of these in this (Jackson) County, Ill., and if my memory serves me correctly a specimen of *ulalume* was submitted to Mr. Strecker for identification.

In his book, "The Moth Book," Dr. W. J. Holland figures *Catocala carolina* as a new sub-species—the date of copyright of both being 1903.

This season I have taken a number of *Catocala ulalume*, some of them of the size of Dr. Holland's figure, while others are larger. Why is not Dr. Holland's *C. carolina* Mr. Strecker's *C. ulalume*? The markings are the same and they are constant. I would not class it as a form of *L. dejecta* without breeding. I tried to get eggs this season to breed it but failed. I always find *C. ulalume* on hickory trees, sometimes several on the same tree, having much the habit of *C. flebilis*.

January, 1919

A NEW SPECIES OF ARGIA (ODONATA).

BY CLARENCE H. KENNEDY, RALEIGH, N. C.

Argia rita, n. sp.

Holotype.—Female, collected in the Santa Rita Mts., Arizona, July, by F. H. Snow, and now in the Snow collection at Kansas University, Lawrence, Kansas. The label does not give the year, but gives the elevation as 5 to 8,000 feet. The male is unknown.

It is difficult to even surmise the nearest relatives of this species. The shape of the lateral lobe of the mesostigmal lamina suggests that of *agrioides*, but in *agrioides* there is no pit beneath it.

Length of abdomen 30 mm., length of hind wing 26 mm.

Female.—Colour: labium pale, labrum bluish (?), face and head otherwise violaceous except the ventral surfaces which are pale straw. Each postocular area bounded anteriorly and posteriorly by a narrow bar of black.



Fig. 3.—*Argia rita*: colour-pattern of type.

Prothorax violaceous, darker above, the side with a sinuous line, the dorsum with a heavy Y mark, the fork opening caudad.

Mesothorax and metathorax violet becoming paler on the sides. Mid-dorsal keel pale but edged by a very narrow, mid-dorsal, black stripe which widens above but fades out below. Pits of mesostigmal laminae black. Antealar ridges black. A small, black spot on the upper part of the mesinfraepisternum. Humeral stripe narrow in the lower half, narrowing to a hair line above but widening into an oval spot at the alar ridge. Second lateral suture with a hair line of black. Pterostigmata brown. Legs with a narrow anterior stripe on the femur and a pale brown stripe on the ventral side of the tibia, otherwise bluish gray.

Abdomen violaceous on segments 1 and 2, brown on segments 3 to 7, and blue on segments 8 to 10. The following black markings occur (see fig. 3): a pair of stripes on segment 2, mere hair lines with the posterior end of each

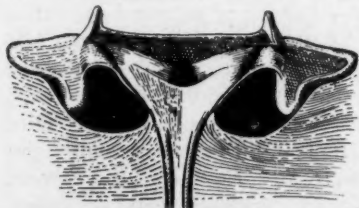


Fig. 4.—*Argia rita*: dorsal view of mesostigmal laminae.



Fig. 5.—*Argia rita*: lateral view of mesostigmal laminae.

enlarged into a triangular spot; an apical ring, incomplete below on segments 2 to 6; a saddle-shaped spot on the apex of segments 3 to 6. This is connected

anteriorly on segment 6 with a lateral line on either side which appears on segments 3 to 5 as a detached antero-lateral spot. Segment 7 with the dorsum black except for a narrow space across the anterior end and the anterior two-thirds of the mid-dorsal line which are pale.

This female is distinguished at once by the two enormous pits or depressions on the anterior ends of the mesepisterna. There is one under each mesostigmal lamina. See figs. 4 and 5.

In the figure (3) of the colour-pattern the abdomen is slightly rotated.

This description should have appeared in the paper on new *Argias*, recently published in the Canadian Entomologist, but was overlooked.

SOME NEW LACHNIDS OF THE GENUS LACHNIELLA.

(HOMOPTERA-HEMIPTERA.)

BY H. F. WILSON, MADISON, WIS.

The genus *Lachniella* is now understood to be the correct genus for most of the Lachnids formerly placed in the genus *Lachnus*. The type of the true genus *Lachnus* is *Lachnus fasciatus* Burmeister, a species definitely determined upon by European aphidologists. This species has but one branch to the median vein, while *Lachniella* has two forks. The writer has under preparation a *Monograph of the Lachninae of North America*, but it now seems impossible to have the illustrations printed until after the war, and so the following new species are presented at this time.

Lachniella inoptis, n. sp.

From material collected by Mr. Theo. Pergande at Washington on *Pinus inops*? Two slides containing one alate and four apterous specimens both labeled *Lachnus inoptis*, n. sp. Types in collection of U. S. Bureau of Entomology.

Apterous viviparous female.—Antennæ light at the base and dusky at the tip. Femora of all legs dark, front tibiae entirely black. Tibiæ on middle and hind pair of legs light coloured at the base and black over the distal two-thirds. Antennæ long and slender, the sixth segment finger-like and slightly shorter than the fourth. Third segment approximately equal to the fourth and fifth together; fifth considerably larger than the fourth. Third and fourth segments without sensoria, fifth with one large sensoria at the distal end. Cornicles with a large, acutely sloping base. Cauda acute, anal plate slightly disked. Hairs on antennæ, legs and body distinctly spine-like and long.

Measurements.—Length of body 3.25 mm. Length of antennal segments, III, 0.64 mm.; IV, 0.31 mm.; V, 0.37 mm.; VI, 0.22 mm. Total length 1.76 mm. Beak, III, 0.25 mm.; IV, 0.25 mm.; V, 0.12 mm. Total length 2.08 mm. Length of hind tibiae 2.39 mm.; hind tarsus, 0.25 and 0.37 mm.

Alate viviparous female.—Antennæ light coloured throughout the third segment except a small part at the distal end, fourth and fifth segments light dusky at the base, darker at the tip, sixth segment entirely dusky. Femora dark except at the base, tibiae dark at the knees and along the distal one-third, the basal two-thirds light-coloured. Third antennal segment with a single sensoria near the distal end, fourth segment with none, fifth segment of one antenna with one large sensorium at the distal end, the other one with an

additional smaller one at the centre. The beak extends slightly beyond the hind pair of coxæ. Nectaries large and volcano-shaped. Wing venation typical for the genus. Hairs upstanding, long and thick, distinctly spine-like.

Measurements.—Length of body 3.25 mm. Length of antennal segments: III, 0.64 mm.; IV, 0.31 mm.; V, 0.35 mm.; VI, 0.23 mm. Total length 1.7 mm.? Beak: III, 0.27 mm.; IV, 0.23 mm.; V, 0.1 mm. Total length 2 mm. Length of hind tibia 2.4 mm.; hind tarsus 0.25 and 0.37 mm.

***Lachniella thunbergii*, n. sp.**

Described from five slides containing a number of oviparous females and one alate male. Three of the slides also contain apterous specimens of another species. No description of the latter has been attempted. The following notes from Mr. Theo. Pergande's records were furnished me by Mr. Baker. Types in collection of U. S. Bureau of Entomology.

Apterous oviparous female.—Specimens in balsam, colour cannot be determined. Antennæ in balsam clear except at tip, distal end of third and fourth, and all of fifth and sixth antennal segments, deep brown, nearing black. Legs with knees dark brown, first and second pair with tibiæ light in the middle and dark at the ends. Hind tibiæ with clear area extending only from near base to one-third the entire length; tarsi and other portions dark brown. Body, legs and antennæ with setaceous upstanding hairs.

Antennæ reaching to second pair of coxæ. Third and fourth segments with a single small, round sensoria near the distal end. Fifth with two large sensoria toward the distal end. Nectaries bell-shaped and of medium size. Anal plate bilobed. Hind tibiæ with numerous small sensoria.

Measurements.—Length of body 3.4 mm. Length of antennal segments: III, 0.46 mm.; IV, 0.21 mm.; V, 0.23 mm.; VI, 0.2 mm. Total length 1.25 mm. Length of beak 1.67 mm. Length of hind tibiæ 2.23 mm. Length of hind tarsus 0.29 mm.

Alate Male.—Antennæ black throughout. Front legs with femora yellowish at the base and brownish black toward the knee, knee nearly black, tibiæ light brown, being darker at the base and at the tip, tarsi dusky brown to black. Middle legs the same. Hind legs with tarsi, tibiæ and distal two-thirds of femora brownish black. Antennæ long and stout, and the third, fourth and fifth segments with numerous raised sensoria of variable size. Wing venation as in other species of this group. Nectaries appear to be much larger than in the apterous forms and with a much wider cone-shaped base.

Measurements.—Length of body from vertex to tip of abdomen, 2.25 mm. Length of antennal segments: III, 0.7 mm.; IV, 0.29 mm.; V, 0.146 mm.; VI, 0.21 mm. Total length 1.7 mm. Length of beak 1.77 mm. Length of hind tibiæ 2.17 mm. Length of hind tarsi 0.31 mm.

***Lachniella vandykei*, n. sp.**

From material collected at Hemphry, Washington, by E. C. Van Dyke on *Picea* sp., May 28, 1914. Original material in alcohol, descriptions from balsam mounts. Types in writer's collection.

Apterous viviparous female.—Antennæ light toward the base and dusky toward the tip. Legs light toward the basal portion and dusky otherwise. Nectaries and cauda dusky to black. Antennæ with the third segment shorter

than the fourth, fifth and sixth. Fourth segment shorter than the sixth. Third segment with one, two or no sensoria, fourth with one, and fifth with two. Beak extending to base of nectaries. Nectaries large and broadly cone-shaped. Body globose, the abdomen being wider than long. Body, legs and antennae set with fine, silky hairs of medium length.

Measurements.—Length of body 2.25 mm. Length of antennal segments: III, 0.41 mm.; IV, 0.187 mm.; V, 0.23 mm.; VI, 0.19 mm. Total length 1.18 mm. Beak: III, 0.21 mm.; IV, 0.17 mm.; V, 0.085 mm. Total length 1.78 mm. Length of hind tibiae 1.46 mm. Hind tarsus 0.37 mm.

Alate viviparous female.—Antennae with basal two-thirds of third segment light-coloured remaining part of third and all of the other segments dusky. Legs alike in colouring with basal portions of the femora and tibiae except the joints light coloured, remaining portions dusky. Cauda and anal plate dusky to black. Antennae with third segment shorter than the fourth, fifth and sixth together. Fourth segment shorter than the sixth. Third segment with six to eight large, round sensoria, fourth with one or two, and fifth with two. Beak reaching slightly beyond the nectaries, in normal specimens. In specimens somewhat shrunken it appears to reach to the tip of the abdomen. Nectaries large and broadly cone-shaped.

Measurements.—Length of body 2.26 mm. Length of antennal segments: III, 0.52 mm.; IV, 0.18 mm.; V, 0.27 mm.; VI, 0.21 mm. Total length 1.28 mm. Beak: III, 0.21 mm.; IV, 0.166 mm.; V, 0.083 mm. Total length 1.97 mm. Length of hind tibiae 1.84 mm.

***Lachniella gracilis*, n. sp.**

From a slide containing one apterous and two alate specimens collected by Theo. Pergande in the District of Columbia, May 27, 1894, on *Pinus inops*. Pergande applied the name here given, and it has been retained for that reason. Other slides in the material appear to be the same species, but in this case it seemed best to use but the one slide in setting this type. Types in the U. S. Bureau of Entomology collection.

Apterous viviparous female.—Antennae light at the base and shading to dusky at the tip. Front and middle pair of legs light coloured except at the joints, third pair black except a small area just beyond the base. Cauda dusky to black. Third antennal segment approximately equal to the length of the fourth, fifth and sixth segments together. Fourth and fifth segments approximately equal in length, and the sixth shorter than the fourth. Third segment without sensoria although a single small one was observed on other specimens, fourth segment with one or two sensoria and the fifth with two nectaries cone-shaped, and unusually large. Cauda rather more angular than rounded, but with a widely rounded tip. Hairs short and much more inconspicuous at the base of the tibiae than at the tip. Hairs at the base distinctly upstanding, those toward the distal end semi-erect.

Measurements.—Length of body 3.25 mm. Length of antennal segments: III, 0.46 mm.; IV, 0.21 mm.; V, 0.21 mm.; VI, 0.145 mm. Total length 1.22 mm. Beak: III, 0.25 mm.; IV, 0.187 mm.; V, 0.063 mm. Total length 1.86 mm. Length of hind tibiae 2.45 mm. Length of hind tarsus 0.31 mm.

Alate viviparous female.—Antennae light at the base of the third segment,

but dusky at the tip and shading into colour of other segments, the last one being nearly black. First and second pair of legs dark to black, except the greater portion of the tibiae. Hind legs almost black throughout except a small, dusky area near the base. Antennal segments as in the apterous forms, except that the fifth segment is longer than the fourth. Third segment with six, the fourth with two or three, and the fifth with two large sensoria. The sensoria are unusually large as in the apterous forms, and are volcanic in shape rather than cone-shaped. The legs and antennae are quite hairy, and those of the base of the tibiae are upstanding while those farther outward are inclined. Cauda angular but broadly rounded at the tip.

Measurements.—Length of body 3.88 mm. Length of antennal segments: III, 0.52 mm.; IV, 0.187 mm.; V, 0.23 mm.; VI, 0.166 mm. Total length 1.2 mm. Beak: III, 0.21 mm.; IV, 0.175 mm.; V, 0.063 mm. Total length 1.9 mm. Length of hind tibiae 2.42 mm.; hind tarsus 0.31 mm.

Lachniella pacifica, n. sp.

From material bearing accession numbers of A. D. Hopkins and Theo. Pergande, collected at Eureka, California, May 19, 1903, on *Abies grandis*. Three alate specimens, several pupae and one apterous specimen in poor condition. However, general characters of species quite distinct. Types in U. S. Bureau of Entomology collection.

Alate viviparous female.—In balsam the legs appear to have been fairly dusky throughout, although the hind pair are much darker than the others. Hind tibiae with only a faint indication of the usually light area near the base of the tibiae. Antennae rather stout, third segment with seven to nine large sensoria, fourth with three and fifth with two. Nectaries mostly obscured but appear to be small and having a comparatively small base. Antennae, legs and body with short hairs of rather fine texture. On the femora and base of the tibiae they stand erect, while toward the tip of the latter they are inclined.

Measurements.—Length of body 1.86 mm.? Length of antennal segments: III, 0.41 mm.; IV, 0.166 mm.; V, 0.187 mm.; VI, 0.12 mm.? Total length 1.04 mm.? Beak: III, 0.187 mm.; IV, 0.145 mm.; V, 0.063 mm. Total length 1.78 mm. Length of hind tibiae 1.86 mm.; tarsus 0.31 mm.

Lachniella atlantica, n. sp.

From material collected by L. C. Bragg, at Webster, Massachusetts, June 19, 1909, on *Pinus* sp. Two slides containing three alate and five apterous forms. One slide in writer's collection, others in collection of C. P. Gillette.

Apterous viviparous female.—Antennae light at base of third segment, remaining parts dusky black. All three pairs of legs black except the base of the femora, and a yellow area toward the base of each tibia. Third antennal segment approximately equal in length to the fourth and fifth together. Fourth segment slightly shorter than the fifth, and the sixth shorter than the fourth. Third segment with a single sensoria, fourth with one and fifth with two. Beak extending to the tip of the abdomen. Nectaries extremely large, volcano-shaped.

Measurements.—Length of body 2.37 mm. Length of antennal segments: III, 0.44 mm.; IV, 0.21 mm.; V, 0.23 mm.; VI, 0.166 mm. Total length 1.25 mm. Beak: III, 0.21 mm.; IV, 0.187 mm.; V, 0.063 mm. Total length 2.04 mm. Length of hind tibia 2.20 mm. Hind tarsus 0.31 mm.

Alate viviparous female.—Colour of antennæ and legs as in the apterous form. Third antennal segment approximately equal in length to fourth. Third antennal segment approximately equal in length to fourth. Third segment with six to eight large, circular sensoria, fourth with two and fifth with two. Nectaries extremely large. Beak extending to the base of the nectaries. Hairs on legs, body and antennæ fairly abundant and longer than those of other species in this group. Those on the femora and at the base of the tibiæ are not quite as upstanding as with other species in this group.

Measurements.—Length of body 2.39 mm. Length of antennal segments: III, 0.46 mm.; IV, 0.21 mm.; V, 0.23 mm.; VI, 0.145 mm. Total length 1.28 mm. Beak: III, 0.21 mm.; IV, 0.187 mm.; V, 0.063 mm. Total length 2 mm. Length of hind tibiæ 2.08 mm. Hind tarsus 0.33 mm.

***Lachniella arizonica*, n. sp.**

Descriptions made from eleven specimens on three slides. Specimens collected on *Pinus* sp. at Williams, Arizona, June, 1901, by E. Q. Schwarz. Types in U. S. Bureau of Entomology collection.

Apterous viviparous female.—General colour characteristics cannot be determined. Antennæ with basal half of third segment light coloured, remaining segments dusky to black. Legs black, except bases of femora, and a small section of the tibiæ near their bases.

Antennæ extending to the third pair of coxæ, the third segment longer than the fourth, fifth and sixth together. Third segment with one to three small sensoria near the distal end. Nectaries large and with a wide, cone-shaped base. This species is entirely different from all other lachnids I have seen because the surface of the body is reticulated, and the spines on the antennæ, body and legs, except on the tarsi and caudal plate, have the appearance of being capitate.

Measurements.—Length of body 5 to 6 mm. Width 3 mm. Length of antennal segments: III, 0.96 mm.; IV, 0.35 mm.; V, 0.27 mm.; VI, 0.17 mm. Total of beak 1.7 mm. Length of hind tibiæ 5.12 mm.

Alate viviparous female.—Colour characteristics cannot be determined. Dark and light coloration of antennæ and legs as in the apterous forms. Antennæ reaching to base of third pair of coxæ. Third segment about equal in length to the fourth, fifth and sixth segments, and with from two to four irregular-sized sensoria along the distal half. Fourth with two, and fifth normally with two. Body does not show reticulations as in apterous forms, but the hairs are similar and are strongly spine-like.

Measurements.—Length of body 5 to 6 mm. Length of antennal segments: III, 0.9 mm.; IV, 0.39 mm.; V, 0.37 mm.; VI, 0.166 mm. Total length 1.98 mm. Length of beak 1.9 mm. Length of hind tibiæ 5.2 mm. Cauda broad and rounded at the tip.

(To be continued.)

RECENT CANADIAN PUBLICATIONS.

(Continued from Vol. L, p. 427).

CANADIAN BARK-BEETLES. PART II—A PRELIMINARY CLASSIFICATION WITH AN ACCOUNT OF THE HABITS, INJURIES AND MEANS OF CONTROL. By J. M. Swaine. Bulletin No. 14 (Technical Bulletin) Dept. of Agriculture, Entomological Branch, Ottawa. Issued Sept. 6, 1918. 143 pp. 31 pls.

It is only within comparatively recent years that the importance of the Bark-beetles as enemies of North American forests has been fully appreciated even by the forest entomologist. Every year the necessity of stricter economy in the conservation and utilization of our forests becomes more urgent, and it is, therefore, fortunate that we have in Canada so able an authority as Mr. Swaine as a source of information, both practical and scientific, on this group of depredators.

The first part of this bulletin, which was published in 1917, contains descriptions of a large number of new species of bark-beetles. The second part treats of their habits, bionomics and classification, as stated in the title, and has been prepared with the object of enabling students and practical foresters to identify the Canadian species of this group of insects. It is divided into four sections, the first entitled "The Beetles and their Habits;" the second, "Bark-beetle Injuries and the Means of Control;" the third, "Structural Characters of the Bark-beetles," and the fourth, "Classification. A Preliminary Arrangement of the Canadian Bark-beetles."

Section 1 is an admirable account of the general life-history of these insects, based upon an intimate first-hand knowledge of a great variety of species. The different types of egg tunnels, larval mines, methods of oviposition, and other details of their habits are described with conciseness and precision. Among other interesting features in this section are the statements that the so-called ventilation tunnels are used mainly as turning-niches by the females during oviposition and as storage places for boring dust and that the nuptial chambers are used by some species for the same purposes.

In Section II the species of bark-beetles are grouped under three headings, primary enemies, secondary enemies and neutral species. Primary enemies are those species which commonly attack and kill healthy trees, the most important of these being certain large forms belonging to the genus *Dendroctonus*. Secondary enemies are those species which habitually breed in the bark of dying trees and logs, but these are frequently injurious in that they kill weakened trees which might otherwise recover. Secondary enemies may become of primary importance under conditions favourable for their rapid reproduction, as in the case of various species of *Ips*. All of the Canadian species under normal conditions seem to prefer to breed in dying or weakened trees. Some of the twig-boring species may be abundant enough to cause some injury, while others may be actually beneficial by hastening the death of the lower branches of pines and spruces, thus helping to produce cleaner trunks. The neutral species are of no economic importance as they breed only in dying or dead bark.

Attention is called to the effect which neglected slashings produce in increasing the number of scattered dying trees in the vicinity on account of the favourable conditions thus brought about for the breeding of bark-beetles.

January, 1919

These conditions are frequently the cause of outbreaks of one or more species, which may be local (sporadic) or more general (epidemic) according to the nature of the species of beetle involved in the attack. At the present time outbreaks of a serious character are still in progress in certain parts of British Columbia, caused by two species of *Dendroctonus*, the Western Pine Bark-beetle (*D. brevicornis* Lec.) and the Western White Pine Bark-beetle (*D. monticolæ* Hopk.). Both of these species are destroying yellow pine in Southern British Columbia, while the latter species is also attacking western white pine and lodgepole pine.

Various other conditions favouring bark-beetle outbreaks also described in this section, followed by an account of the natural factors and artificial methods of control.

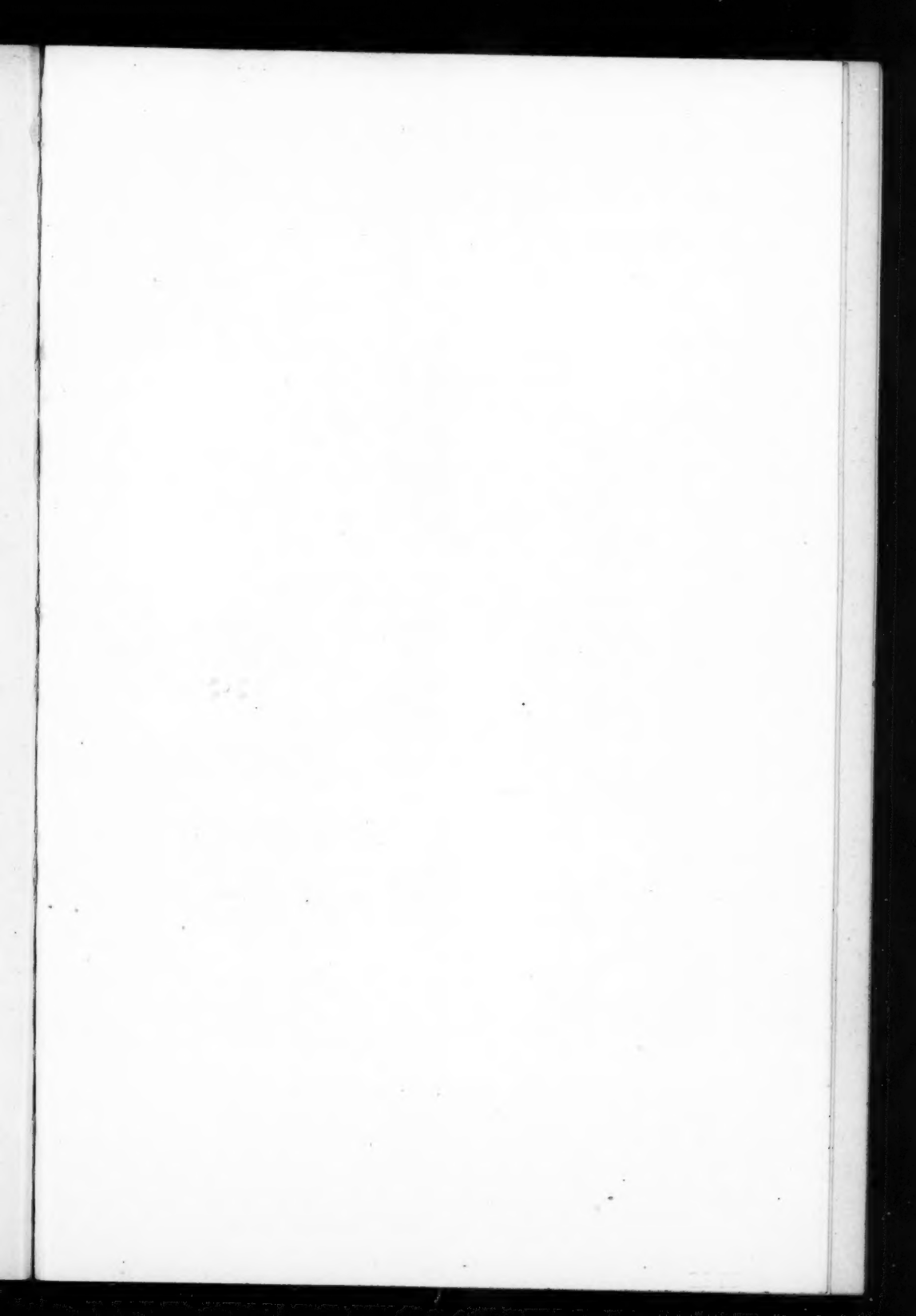
The greater part of the bulletin, constituting Section III and IV is devoted to the taxonomy and systematic treatment of the species. The external structures, in so far as they are of value in the determination of genera and species, are described in detail, but the internal characters are omitted, as they are useful only to the expert.

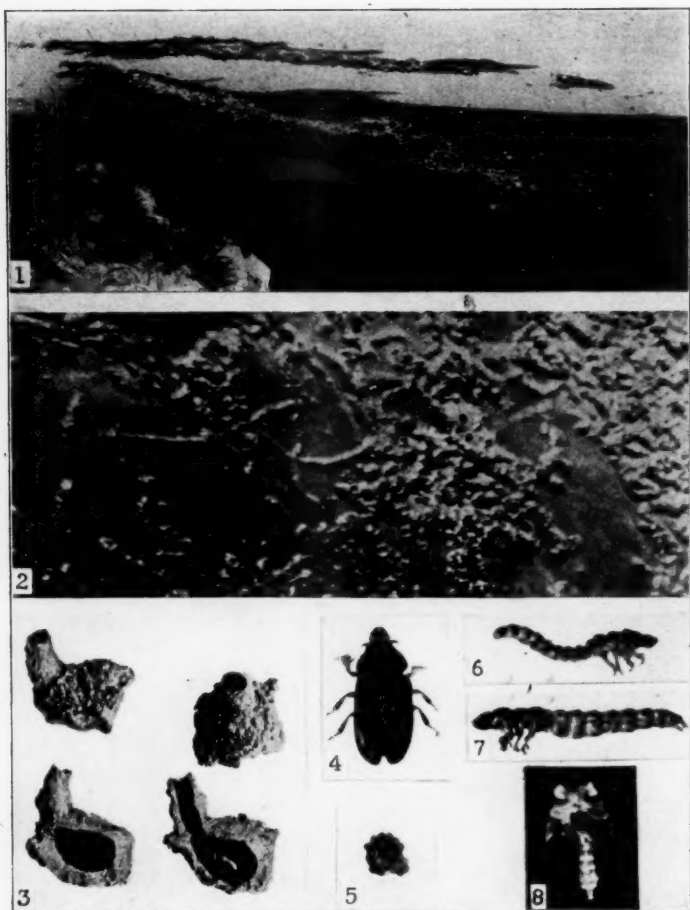
The bark-beetles constitute the superfamily Ipoidea (Scolytoidea), all the Canadian species except one (*Platypus wilsoni* Sw., fam. Platypodidæ) belonging to the family Ipidæ. Keys for the separation of the families, sub-families, genera and species are given, and not only all the Canadian species but also the majority of those found in the Northern United States are included, as many of the latter may eventually be discovered in Canada.

In the detailed account of the species, descriptive notes or full descriptions are given when necessary, with the names of the host tree and a brief statement of the geographical distribution. Ten new species are described, and 135 species are definitely recorded from Canada.

The illustrations are beyond criticism. There are 31 plates, the great majority being heliotype reproductions of photographs and drawings by Mr. A. E. Kellett. The drawings are second to none we have ever seen, and the beauty of their general appearance is in no way marred by the extraordinary minuteness with every detail is rendered. The photographs, showing the tunnels in the bark and wood and other features of the work of the beetles and their larvæ are likewise extremely fine.

Altogether this remarkable work deserves very special praise. It is one of the finest contributions to Canadian entomology that has ever been published, and great credit is due to the author, the artist and the Dominion Entomological Service.





THE HABITS OF HETEROCERUS BEETLES.

1. Mud bar where the beetles breed. 2. Burrows made by the larvæ. 3. Pupal cases.
4. Adult. 5. Eggs. 6. Larva. 7. Larva ready to pupate. 8. Pupa.

